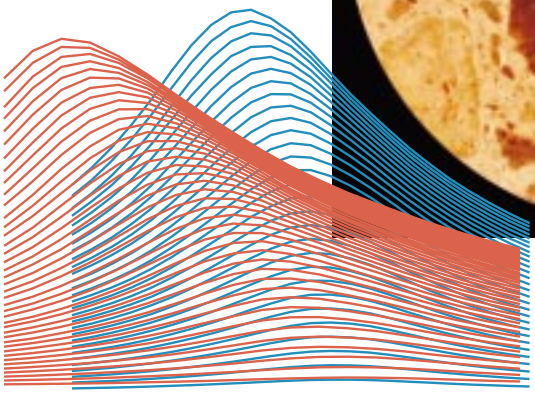
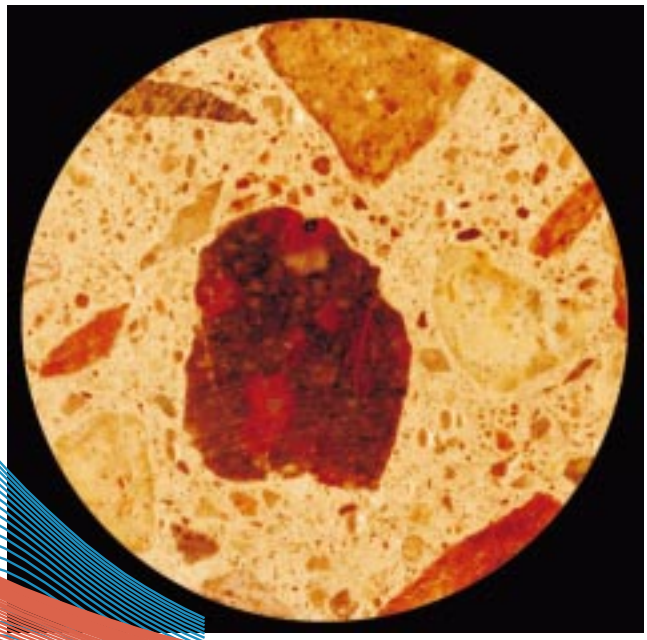
Nonlinear Resonant Ultrasonic Inspection

Los Alamos National Laboratory and Dynamic Resonance Systems, Inc.

Nonlinear acoustical techniques of interrogation are the frontier of acoustical nondestructive testing. These techniques offer the most sensitive acoustical measurement of damage in existence today. Nonlinear resonant ultrasonic inspection (NRUI) is the first of several nonlinear methods that will eventually be available. NRUI offers previously unimagined sensitivity, fast application, and easy interpretation.





The photo shows a concrete core like the ones being tested to find damage using the NRUI technique. Very small interior cracks, like those in this core sample, often escape detection by conventional nondestructive evaluation techniques. NRUI, on the other hand, detects tiny flaws very easily and can track the evolution of such flaws over time.

Applications

NRUI can be broadly applied in the following areas:

- detection of physical changes in rock cores;
- monitoring of damage and aging in concrete and cement;
- detection of flaws in aircraft and spacecraft components;
- inspection of composite materials, bridges, and other transportation infrastructure; and
- detection of cracks and other damage in assembly-line-manufactured items such as automobile components.

Benefits

Our technology can provide benefits over existing nondestructive analysis methods through

- increased sensitivity;
- the ability to obtain results without a test standard;
- damage monitoring over time; and
- future cost savings from assembly-line manufacturing.

Availability of applications for commercial licensing

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